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WEEK:

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TITLE: Noise suppression device for tires, includes a pair of shield objects which are arranged at symmetrical position of rim by connection unit

PATENT-ASSIGNEE: SUMITOMO RUBBER IND LTD [SUMR]

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PATENT-FAMILY:

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ABSTRACTED-PUB-NO: JP2000062408A

BASIC-ABSTRACT:

NOVELTY - A pair of shield objects (9) separated at an angle of 180 deg. , are arranged along the peripheral direction of tire lumen (H). A connection unit (10) fixes the shield object at symmetrical position along the rim (2) under tension. The shield object consists of sponge material.

USE - For suppressing noise of tires.

ADVANTAGE - Since connection unit fixes the shield objects at symmetrical position of rim, road noise is reduced effectively

without causing vibration. Since the shield objects are arranged at an angle of 180 deg. , the weight of object on the lumen is balanced.

DESCRIPTION OF DRAWING(S) - The figure shows the perspective view of noise suppression device.

Rim 2

Shield object 9

Connection unit 10

Lumen H

CHOSEN- Dwg.2/4  
DRAWING:

TITLE-TERMS: NOISE SUPPRESS DEVICE PAIR SHIELD OBJECT ARRANGE  
SYMMETRICAL POSITION RIM CONNECT UNIT

DERWENT-CLASS: Q11

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(71) 出願人 000183233

住友ゴム工業株式会社

兵庫県神戸市中央区脇浜町3丁目6番9号

(72) 発明者 岩村 和光

兵庫県神戸市須磨区横尾5丁目2番地56-505

(74) 代理人 100082968

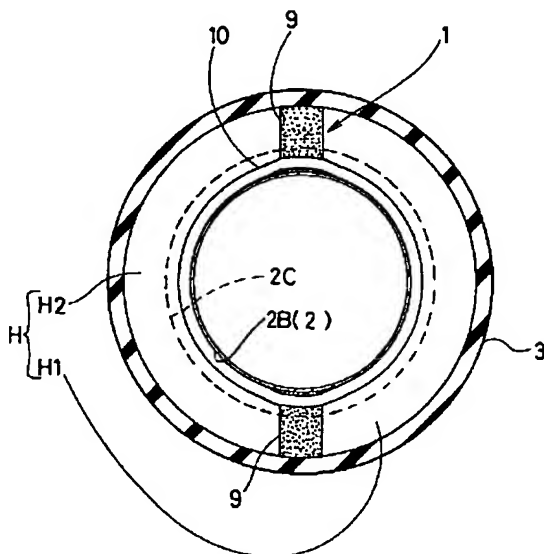
弁理士 苗村 正 (外1名)

(54) 【発明の名称】 ロードノイズ抑制装置

(57) 【要約】

【課題】 一対の遮蔽体を、重量バランスを損ねることなくリムの対称位置に固定することができ、振動の発生をもたらすことなくロードノイズを効果的に低減しうる。

【解決手段】 タイヤ3とリム2とに囲まれるタイヤ内腔H内に装着されるロードノイズ抑制装置1であって、スポンジ材からなりタイヤ内腔Hを周方向に略二分割する一対の遮蔽体9、9を、連結部材10で連結している。連結部材10は、リム底2Bに沿って張力を有してのびることにより前記遮蔽体9をリム2に固定させる。



## 【特許請求の範囲】

【請求項1】 リムに装着されるタイヤと前記リムにより囲まれるタイヤ内腔内に装着されるロードノイズ抑制装置であって、

スポンジ材からなりかつ約180度の角度を隔ててタイヤ内腔の少なくとも一部を遮ることによりこのタイヤ内腔を周方向に略二分割しうる一対の遮蔽体と、この一対の遮蔽体を連結しかつリム底に沿い張力を有してのびることにより前記遮蔽体をリムに固定させる連結部材とからなることを特徴とするロードノイズ抑制装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は、タイヤのロードノイズを低減でき、走行時の静粛性を達成しうるロードノイズ抑制装置に関する。

## 【0002】

【従来の技術】 近年、乗用車の低騒音化、静粛化が強く望まれており、そのためにはタイヤの騒音をも減じることが必要となる。

【0003】 タイヤに起因する騒音としては、トレッドパターンに基づくパターンノイズ、路面との間のきしみ音、すべり音に加えて、走行時250Hz付近の低周波範囲でピークを迎えるいわゆるロードノイズが知られており、これは車内でのこもり音となって運転者に不快感を与えるなどその影響は大である。

【0004】 このロードノイズは、路面の凹凸から受けるトレッド面での衝撃がタイヤ内腔内の空気を共鳴させることに原因し、特に、トレッド部をスチールコード等のベルト層で補強したラジアルタイヤにおいて顕著に発生する。従って、従来、例えばトレッドゴムやベルト層を変更するなどしてトレッド剛性を減じ、トレッドの衝撃を緩和させる等のタイヤ構造側での対策が図られているが、ロードノイズを充分に低減させることは難しかった。

【0005】 他方、特公平7-14682号公報等に提案される如く、タイヤ内腔内に遮蔽体を挿入しタイヤ内腔内の気柱を遮断することによってロードノイズを効果的に低減しうることが明らかになっている。

## 【0006】

【発明が解決しようとする課題】 しかし、このような遮蔽体は、たとえ圧縮状態で挿入されたとしても、走行時にはタイヤ内腔内で移動するなどタイヤの重量バランスを悪化し、振動を発生させるという新たな問題がある。

【0007】 そこで本発明は、リム底に沿って張力を有してのびる連結部材を用い、スポンジ材からなる一対の遮蔽体を約180度の角度を隔てて連結しかつリムに固定させることを基本として、一対の遮蔽体を、重量バランスを損ねることなくリムの対称位置に固定することができ、振動の発生をもたらすことなくロードノイズを効果的に低減しうるロードノイズ抑制装置の提供を目的と

している。

## 【0008】

【課題を解決するための手段】 前記目的を達成するために、本発明は、リムに装着されるタイヤと前記リムにより囲まれるタイヤ内腔内に装着されるロードノイズ抑制装置であって、スポンジ材からなりかつ約180度の角度を隔ててタイヤ内腔の少なくとも一部を遮ることによりこのタイヤ内腔を周方向に略二分割しうる一対の遮蔽体と、この一対の遮蔽体を連結しかつリム底に沿い張力を有してのびることにより前記遮蔽体をリムに固定させる連結部材とからなることを特徴としている。

## 【0009】

【発明の実施の形態】 以下、本発明の実施の形態を、図示例とともに説明する。図1はロードノイズ抑制装置1の斜視図であり、又図2、3はロードノイズ抑制装置1がタイヤ内腔H内に装着された状態を示すタイヤ赤道Cに沿う断面図及び子午線に沿う断面図である。

【0010】 ここで、タイヤ内腔Hは、リム2に装着されるタイヤ3と、前記リム2とにより囲まれる環状の空間であり、タイヤ3は、接地面を形成するトレッド部5と、その両側から半径方向内方にのびるサイドウォール部6と、各サイドウォール部6の内方端に形成されるビード部7とを具え、このビード部7を前記リム2のリムシート2Aに着座させて嵌着される。

【0011】 なおタイヤ3は、本例では、タイヤ内腔Hに向く内面を、空気不透過性のブチル系ゴムからなるインナーライナで被覆したチューブレス構造をなすことにより、前記タイヤ内腔Hを気密に形成する。なおタイヤ3として、本例では乗用車用の場合を例示しているが、他にバス・トラック等の重荷重車両用、小型トラック用、自動二輪車用など、種々な用途のものが利用でき、又タイヤ構造も、ラジアル、セミラジアル、バイアスなど種々な周知のものをを用いる。

【0012】 次に、ロードノイズ抑制装置1は、一対の遮蔽体9、9と、この一対の遮蔽体9、9を連結しかつ前記リム2に固定させる連結部材10とから形成される。

【0013】 遮蔽体9は、多孔性ゴム性材であるスポンジ材によって形成されるブロック状体であり、約180度の角度を隔てた点対称の位置に配置されるときともに、前記タイヤ内腔Hの少なくとも一部を遮ることにより、このタイヤ内腔Hを周方向の二つの空気室H1、H2に略二分割する。これによって、前記250Hz近傍での気柱共鳴を阻止する。

【0014】 この気柱共鳴の阻止の観点から、前記遮蔽体9は、タイヤ内腔Hの断面積の60%以上を遮ることが必要であり、好ましくは80%以上、さらには本実施例で例示する如く、タイヤ内腔面と実質的に密着し略完全に遮ることが好ましい。そのために、特に弾力性及び収縮性等に優れタイヤ内腔Hに沿っての変形を容易とし

た、連続気泡を有する所謂スポンジゴムが、独立気泡を有する所謂膨張ゴムに比して好適に採用される。又遮蔽体9では、タイヤ重量の増加を抑制し、かつ接地時のタイヤ変形とともに容易に変形してタイヤ剛性の不均一化を招かないようにすることが必要であり、この点からも前記スポンジゴムが好適である。又その発泡倍率も400～1500%の範囲でより高い方が好ましい。

【0015】なお遮蔽体9として、本例では矩形なブロック状のものを例示しているが、タイヤ内腔Hの形状に合わせ、圧縮量を加味した輪郭形状で形成することもできる。

【0016】又前記連結部材10は、一对の遮蔽体9、9を連結する紐状をなし、リム底2Bに沿って張力を有してのびることにより、前記遮蔽体9、9をリムに固定する。

【0017】連結部材10は、本例では、弾性を有するエンドレス状のバンド体11からなり、前記遮蔽体9を貫通してのびるとともに、この貫通部12において遮蔽体9と接着剤を用いて強固に固着している。連結部材10としては、例えば直径1cm程度のゴム弾性体が好適に採用できるが、種々の太さ及び断面形状のものがリムサイズリム形状等に応じて使用でき、さらには金属製のスプリングなどのバネ弾性体で形成することもできる。又連結部材10の一部を、前記ゴム弾性体やバネ弾性体で形成することによって弾性を付与させても良く、係る場合には、残部を例えば合成樹脂等の非弾性の紐体で形成しうる。

【0018】このように、前記連結部材10を前記弾性体で形成することにより、リムフランジ2Cを乗越してリム底2B内にロードノイズ抑制装置1を装着することができ、しかも装着後において張力を有してリム底2Bに固定できる。従って、遮蔽体9が走行時に位置ズレして車輪全体の重量バランスを悪化させるのを防止できる。又たとえ装置1に位置ズレが生じた場合にも、一对の遮蔽体9、9が対称位置で互いに連結されているため、重量バランスの悪化を最低限に抑えることが可能となる。なお前記張力を安定して発生させるために、連結

部材10の略全体を弾性体で形成することが好ましく、又装着前の連結部材10の周方向長さを、リム底の周方向長さの90%以下に抑えるのがよい。

【0019】又前記連結部材10は、図4に示すように、前記遮蔽体9、9間に途切れ部13を設け、この途切れ部13に接続可能な接続手段14を設けても良い。接続手段14としては、本例では、ナイロンなどの合成樹脂からなる帯状の連結部材片10Aの一方に、鋸歯状の複数の溝部15を形成し、他方の連結部材片10Bに、一方の連結部材片10Aをスライド自在に挿入できかつその溝部15と係合することにより弛み止めを行う爪片16Aを有するスライド孔16を設けている。これによって、連結部材片10A、10B間を張力を有して接続することができ、かかる場合、前記ゴム弾性体或いはバネ弾性体の使用を排除しうるが、使用してもかまわない。

【0020】このように本発明のロードノイズ抑制装置1は、種々の態様に変化させることができる。

【0021】

【発明の効果】本発明は叙上の如く構成しているため、一对の遮蔽体を、重量バランスを損ねることなくリムの対称位置に固定することができ、振動の発生をもたらしことなくロードノイズを効果的に低減しうる。

【図面の簡単な説明】

【図1】本発明の一実施例のロードノイズ抑制装置の斜視図である。

【図2】タイヤ内腔内に装着した状態を示すタイヤ赤道に沿う断面図である。

【図3】その子午断面図である。

【図4】接続手段の一例を示す斜視図である。

【符号の説明】

2 リム

2B リム底

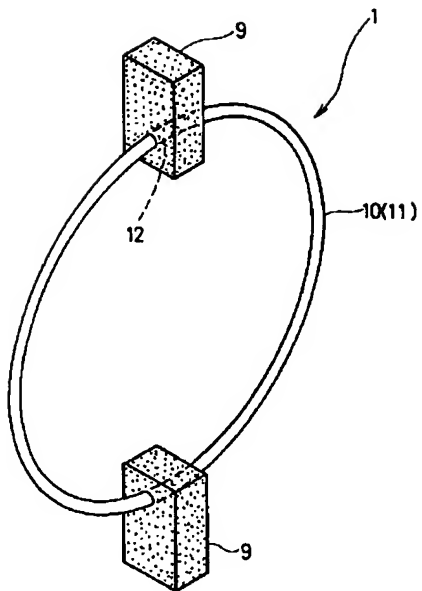
3 タイヤ

9 遮蔽体

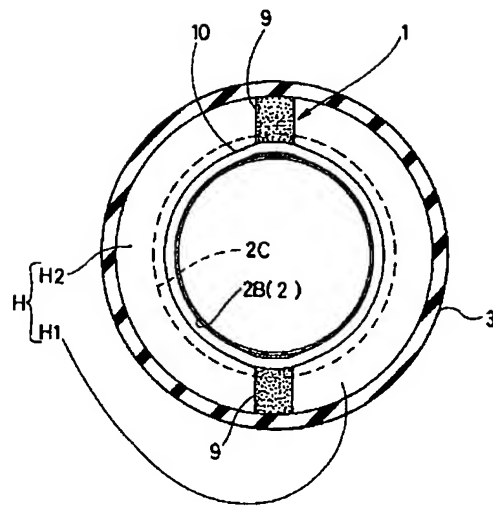
10 連結部材

H タイヤ内腔

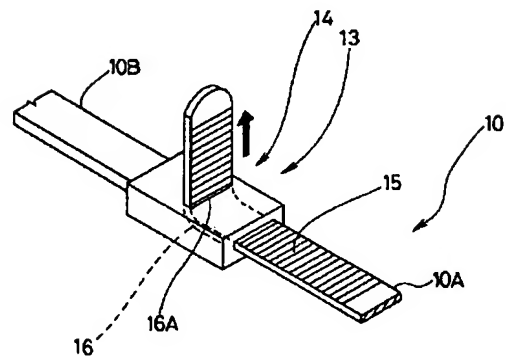
【図1】



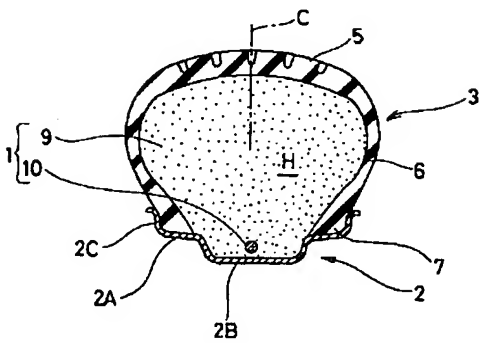
【図2】



【図4】



【図3】



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CLAIMS

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[Claim(s)]

[Claim 1] It is the load noise restraint with which it is equipped in the tire lumen surrounded by the tire with which a rim is equipped, and said rim. The screen of the pair which can carry out abbreviation two piece housing of this tire lumen in a hoop direction by consisting of sponge material, and separating the include angle of about 180 degrees, and interrupting a part of tire lumen [ at least ], The load noise restraint characterized by consisting of a connection member which makes said screen fix to a rim by connecting the screen of this pair, and having tension and being extended along a rim bottom.

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[Translation done.]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention can reduce the load noise of a tire and relates to the load noise restraint which can attain the silence at the time of transit.

[0002]

[Description of the Prior Art] In recent years, the reduction in the noise of a passenger car and quietization are desired strongly, and it is necessary to also reduce the noise of a tire for that purpose.

[0003] The effect, such as the pattern noise based on a tread pattern and the so-called load noise which goes away between road surfaces and greets a peak in the low frequency range near 250Hz at the time of transit in addition to a stain sound and a skid sound being known as noise resulting from a tire, it being [ which it is in the car ] filled, and this serving as a sound, and giving an operator displeasure, is size.

[0004] This load noise results from the impact in the tread side received from the irregularity of a road surface making the air in a tire lumen resonate, and is notably generated in the radial-ply tire which reinforced the tread section with belt layers, such as a steel code, especially. Therefore, although the cure by the side of the tire structure of changing the former, for example, tread rubber, and a belt layer, reducing tread rigidity, and making the impact of a tread ease etc. was achieved, it was difficult to fully reduce a load noise.

[0005] On the other hand, it is clear by inserting a screen into a tire lumen and intercepting the air column in a tire lumen that a load noise can be reduced effectively so that it may be proposed by JP,7-14682,B etc.

[0006]

[Problem(s) to be Solved by the Invention] However, even if such a screen is inserted in the state of compression, it will get worse the weight balance of a tire, such as moving within a tire lumen at the time of transit, and will have the new problem of generating vibration.

[0007] Then, this invention is based on separating the include angle of about 180 degrees, and connecting the screen of the pair which consists of sponge material using the connection member which has tension and is extended along a rim bottom, and making it fix to a rim. The screen of a pair can be fixed to the position of symmetry of a rim, without spoiling weight balance, and it aims at offer of the load noise restraint which can reduce a load noise effectively, without bringing about generating of vibration.

[0008]

[Means for Solving the Problem] In order to attain said purpose, this invention is a load noise restraint with which it is equipped in the tire lumen surrounded by the tire with which a rim is equipped, and said rim. The screen of the pair which can carry out abbreviation two piece housing of this tire lumen in a hoop direction by consisting of sponge material, and separating the include angle of about 180 degrees, and interrupting a part of tire lumen [ at least ], The screen of this pair is connected and it is characterized by consisting of a connection member which makes said screen fix to a rim by having tension and being extended along a rim bottom.



[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with the example of illustration. Drawing 1 is the perspective view of the load noise restraint 1, and drawing 2 and 3 are the sectional views along the sectional view along the tire equator C which shows the condition of having been equipped with the load noise restraint 1 in the tire lumen H, and the meridian.

[0010] It is the annular space surrounded by the tire 3 with which a rim 2 is equipped with the tire lumen H here, and said rim 2, and a tire 3 is equipped with the tread section 5 which forms a ground plane, the sidewall section 6 extended from those both sides to the method of the inside of radial, and the toe of bead 7 formed in a way edge among each sidewall section 6, sits this toe of bead 7 to rim sheet 2A of said rim 2, and is attached.

[0011] In addition, a tire 3 forms said tire lumen H airtightly by making the tubeless structure which covered the inside suitable for the tire lumen H with this example with the inner liner which consists of butyl system rubber of air impermeability. In addition, although the case for passenger cars is illustrated by this example as a tire 3, the thing of various applications, such as objects for heavy loading cars, such as a bus truck, an object for light trucks, and an object for motor bicycles, can be used for others, and tire structure can also use the thing of various common knowledge, such as a radial, a semi radial, and bias.

[0012] Next, the load noise restraint 1 is formed from the connection member 10 which connects the screens 9 and 9 of a pair, and the screens 9 and 9 of this pair, and is made to fix to said rim 2.

[0013] A screen 9 is a letter object of a block formed of the sponge material which is porous gummous material, and it carries out abbreviation two piece housing of this tire lumen H at two air chambers H1 and H2 of a hoop direction by interrupting said a part of tire lumen [ at least ] H while being arranged in the location of the point symmetry which separated the include angle of about 180 degrees. By this, a said about 250Hz air column resonance is prevented.

[0014] It is desirable for said screen 9 to need to interrupt 60% or more of the cross section of the tire lumen H, to stick substantially with a tire lumen side preferably, from a viewpoint of inhibition of this air column resonance, so that it may illustrate by this example further 80% or more, and to interrupt to abbreviation completeness. Therefore, the so-called sponge rubber which has the open cell which made easy deformation which is especially excellent in resiliency, shrinkage characteristics, etc., and meets the tire lumen H is suitably adopted as compared with the so-called expanded rubber which has a closed cell. Moreover, in a screen 9, it is required to control tire weight increase, and to deform easily with the tire deformation at the time of touch-down, and to make it not cause ununiformity-ization of tire rigidity, and said sponge rubber is suitable also from this point. Moreover, the one in 400 - 1500% of range where the expansion ratio is also higher is desirable.

[0015] In addition, although the thing of the rectangle letter of a block is illustrated by this example as a screen 9, it can double with the configuration of the tire lumen H, and can also form in the profile configuration which considered the amount of compression.

[0016] Moreover, said connection member 10 fixes said screens 9 and 9 to a rim by having the shape of a string which connects the screens 9 and 9 of a pair, and extending tension along with nothing and rim bottom 2B.

[0017] In this example, the connection member 10 consisted of a band object 11 of the shape of endless [ which has elasticity ], and it has fixed firmly using a screen 9 and adhesives in this penetration section 12 while it penetrates said screen 9 and is extended. As a connection member 10, although a rubber elasticity object with a diameter of about 1cm can adopt suitably, for example, various sizes and the thing of a cross-section configuration can use it according to a rim size rim configuration etc., and can also form with spring elastic bodies, such as a further metal spring. Moreover, when elasticity may be made to give and it starts by forming a part of connection member 10 with said rubber elasticity object and spring elastic body, the remainder can be formed by inelastic strings, such as synthetic resin.

[0018] Thus, by forming said connection member 10 with said elastic body, its rim flange 2C can be overshoot, and it can equip with the load noise restraint 1 in rim bottom 2B, moreover, it has tension after wearing, and can fix to rim bottom 2B. Therefore, it can prevent that a screen 9 carries out location gap

at the time of transit, and worsens the weight balance of the whole wheel. Moreover, since the screens 9 and 9 of a pair are mutually connected by the position of symmetry also when location gap arises to equipment 1 even if, it becomes possible to suppress aggravation of weight balance to minimum. In addition, in order to be stabilized and to generate said tension, it is desirable to form the whole abbreviation for the connection member 10 with an elastic body, and it is good to hold down the hoop direction die length of the connection member 10 before wearing to 90% or less of the hoop direction die length of a rim bottom.

[0019] moreover, said connection member 10 is shown in drawing 4 -- as -- between said screen 9 and 9 -- breaking off -- the section 13 -- preparing -- this -- it breaks off and the connecting means 14 connectable with the section 13 may be established. As a connecting means 14, the slide hole 16 which has piece of pawl 16A which slackens in one side of band-like piece of connection member 10A which consists of synthetic resin, such as nylon, by forming two or more serrate slots 15, and being able to insert one piece of connection member 10A in piece of connection member 10B of another side, enabling a free slide, and engaging with the slot 15, and performs a stop to it is formed by this example. By this, it has tension, between piece of connection member 10A and 10B can be connected, and, in this case, use of said rubber elasticity object or a spring elastic body can be eliminated, but you may use it.

[0020] Thus, the load noise restraint 1 of this invention can be changed to various modes.

[0021]

[Effect of the Invention] Since this invention is constituted like the above statement, the screen of a pair can be fixed to the position of symmetry of a rim, without spoiling weight balance, and a load noise can be reduced effectively, without bringing about generating of vibration.

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[Translation done.]

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the perspective view of the load noise restraint of one example of this invention.

[Drawing 2] It is a sectional view along the tire equator which shows the condition of having equipped in the tire lumen.

[Drawing 3] It is the meridional sectional view.

[Drawing 4] It is the perspective view showing an example of a connecting means.

[Description of Notations]

2 Rim

2B Rim bottom

3 Tire

9 Screen

10 Connection Member

H Tire lumen

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[Translation done.]